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THE

Journal of the Society of Arts,

AND OF

THE INSTITUTIONS IN UNION.

110TH SESSION.] FRIDAY, NOVEMBER 4, 1864. [No. 624. VOL. XII.

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Announcements by the Council.

NOTICE TO MEMBERS.

The One Hundred and Eleventh Session of the Society will commence on Wednesday, the 16th instant, when the Opening Address will be delivered by WM. HAWES, Esq., F.G.S., Chairman of the Council.

On Wednesday, the 23rd instant, a Paper by WM. FAIRBAIRN, Esq., LL.D., F.R.S., "On the Application of Iron to the Purposes of War and Naval Architecture," will be read.

The Chair is taken at Eight o'clock.

The following are the dates of Meetings for the Session:—

1864.	November	—	—	16	23	30
,,	December	7	14	21	—	
1865.	January	—	—	18	25	
,,	February.....	1	8	15	22	
,,	March.....	1	8	15	22	29
,,	April	5	—	19	26	
,,	May.....	3	10	17	24	31
,,	June	—	—	—	28*	

There will be three Courses of "Cantor" Lectures on the following subjects during the ensuing Session:—

"On the Relation of Science and Art to Manufactures." By B. WATERHOUSE HAWKINS, Esq., F.G.S.

"On the Application of Geology to the Arts and Manufactures." By Professor D. T. ANSTED, M.A., F.R.S.

"On the Application of Chemistry to the Arts." By Dr. F. CRACE CALVERT, F.R.S.

These Lectures are open to Members free of charge, and a Member has the privilege of introducing ONE Friend to each Lecture.

* The Annual General Meeting: the Chair will be taken at Four o'clock. No Visitors are admitted to this Meeting.

Particulars of the Courses will be duly announced in the *Journal*.

The following Institutions have been taken into Union since the last announcement:—

Nailsworth Literary and Mechanics' Institution.
Oswestry Literary Institution.
Hamilton Mechanics' Institution.
Christchurch Working Man's Institute.

DECAY OF WOOD CARVINGS.

The Commission appointed to inquire into the causes of decay in wood carvings and the means of preventing and remedying the effects of such decay, have made their report. The committee consisted of Thomas Graham, Chairman, John O. Westwood, W. Gibbs Rogers, Peter Graham, J. C. Robinson, John Webb, John G. Crace, George Wallis, Secretary. The instructions received from the Committee of Council for Education were to inquire into the causes of decay in wood carvings, with the view to preserving the valuable decorative examples, being public property, now in the South Kensington Museum, and the committee divided their attention to:—1. The various causes of decay, and best means of arresting it; 2. The means which it would be safe to adopt with objects already much damaged; 3. The enclosure of objects in glass cases,—if likely to promote decay and dry rot; 4. The best means of preventing the commencement of decay. As to question 3, the Commission are unanimous in opinion that no injurious effects could possibly follow such a course.

On the causes of decay the Commission have been guided by the facts brought before them by J. O. Westwood, Esq., M.A. Hope Professor of Zoology, Oxford (their colleague), whose report on this point they insert *in extenso*, as follows:—

"The insects which in this country are found to be the most injurious from their habit of burrowing into the wood of furniture, belong to three species of beetles, of small size and cylindrical in form (the better to enable them to work their way through the burrows in the wood), belonging to the family *Ptinidæ*, and known under the systematic names of *Ptilinus pectinicornis, Anobium striatum*, and *Anobium tessellatum*.

"The first of these is about one-fourth of an inch in length, and the male is distinguished by its beautiful branched antennæ; the second, which is by far the commonest and most destructive, is about one-eighth of an inch long and of a brown colour, with rows of small dots down the back; and the third is about one-third to one-fourth of an inch long, the back varied with lighter and darker shades of brown scales.

"These insects are produced from eggs deposited by the females in crevices of the wood-work, from which are hatched small white fleshy grubs, resembling the grubs of the cockchafer in miniature, which generally lie curled upon their sides, making very little use of their six small feet fixed near the head; it is in this state that the insect is chiefly injurious, although the perfect insect itself also feeds on the wood. These grubs make their burrows generally in the direction of the fibre of the wood; but when it becomes thoroughly dry and old, they burrow in all directions.

"When full grown they cease eating, cast off their larva skins, and appear as inactive pupæ or chrysalids, with all the limbs lying upon the breast enclosed in little sheaths; after a short time the perfect insect bursts forth.

"In this country, according to my own observation, the appearance of the insect in the perfect state takes place uniformly during the first hot days at the beginning of summer. I believe the beetles are long lived in their final form; as they may be met with during the summer, but the greater number seem to come forth simultaneously: such is certainly the case with *Ptilinus pecticornis*, as it has attacked my own bedpost, and I have annual opportunities of observing its appearance and have much lessened its numbers by destroying every specimen, for which, of course, I am on the look out. The powers of destruction possessed by these insects is extraordinary in cases where they find a piece of furniture suitable to their taste. I have known a new bedstead completely reduced to powder in three years, and where they do take a liking to a piece of furniture, they seem to devour every particle of the woodwork, and as the perfect insects possess large wings beneath their hard wing sheaths, they are often seen flying in the hot sunshine out of doors, evidently in search of suitable woodwork for themselves and their progeny. I have had the deal flooring of an underground room destroyed by the *Anobium striatum* and they are also equally destructive to beams and rafters of houses, churches, etc., making their entrance at the ends if the beams have been varnished (which of course teaches us that the ends of the beams should be rendered obnoxious to them by coats of paint or saturation). In the perfect state, the insects of the genus *Anobium* are well known under the name of the "Death Watch," as these insects produce the ticking noise occasionally heard in old houses. It is also the *Anobium striatum* which is so injurious in libraries, the grub burrowing through entire volumes, and feeding upon the paper and especially the *pasted* backs of the books.

"The destruction of these insects, when enclosed in articles of furniture, is by no means easy, although, with care, much mischief might be prevented. The saturation of the wood with some obnoxious fluid previous to its being used up in the manufacture of objects of value would, I should think, be beneficial. When manufactured, of course the size of the object affords a greater or less degree of facility in operations for the destruction ot the grub.

"In the cases of articles where many smaller pieces of wood are joined together, saturation would be dangerous, as would also the placing of small objects in tin boxes and subjecting them to heat by plunging the tin case into boiling water (a practice which we employ to destroy the grubs which get into our insect boxes).

"Various infusions have been used for saturation, amongst which creosote appears to be the most effective. It has in fact been found that the woodwork of the jetties at Plymouth saturated with creosote have resisted the action of the marine insects which have done so much damage to the wooden marine erections all round the coast.

"A strong infusion of colocynth and quassia, spirits of turpentine, expressed juice of green walnuts, and pyroligneous acid, have all been proposed. In hot climates the ravages of the *Anobium* on books has been prevented by washing their backs with a fluid compound of corrosive sublimate (10 grains) and 4 ounces of alcohol, and the paste used in the book covers is there also mixed with alcohol.

"Herr Temmnick preserved his books from the *Anobium* by dipping them in a solution of quassia. Except on a small scale, however, the saturation of furniture seems scarcely practicable. Fumigation seems however to be more available. For small objects I know no better plan to destroy the *Anobium* than that which has been adopted successfully at the Bodleian Library on my recommendation, against the book worm, namely to enclose a number of volumes in a box, shutting quite close, and placing a small quantity of benzine in a saucer at the bottom of the case. The same plan might be adopted with small ornamental wood-works, enclosing them in glass cases shut as nearly air tight as possible. This plan in fact seems to me the most efficacious and answers one of the special questions submitted to the commission. I think it very beneficial to enclose infected objects in such cases, as it enables one to examine them at liberty day by day through the glass, and ascertain whether any powder falls from them, caused by the working of the larvæ or when the perfect insect appears. I believe in this manner, small objects might be freed from the ravages of any larvæ which they might have in them. Of course, if left exposed, they would at a future time (*i.e*, at the commencement of the following summer, when the *Anobia* appear in the perfect state) be subject to a fresh visitation and therefore continual enclosure in glass would be a perpetual protection against the insect, which I need not say is not an inherent object in the constitution of the wood, but one which accidentally finds its way there.

"Fumigation, even, on a large scale, might be adopted by having a room made as air-tight as possible, stopping up the chimney, pasting the window-frames, etc., and placing infected furniture in it, burning brimstone or filling the room with fumes of prussic acid or benzine; this plan is adopted with success for the destruction of another obnoxious domestic insect, and I believe would also answer against the *anobium*, especially if practised at the time when the perfect beetles make their appearance; their destruction at that time involving, of course, the prevention of further injury by their progeny."

With regard to the best means of stopping the decay, when commenced, it was decided that certain experiments should be carried out to ascertain the effect of the treatment proposed by the chairman and by Professor J. O. Westwood; and the matter, for this purpose, was placed in the hands of the secretary, Mr. George Wallis. These experiments were carried out to the satisfaction of the commission, and the course of proceedings and the results are as follow:—

At the end of April, 1863, when, from the appearance of certain specimens of carved work, the worm appeared to be developed and active, a large glass case, made as air-tight as circumstances would permit, was filled with examples of furniture, &c. The bottom of this case was covered with white paper, and the specimens of woodwork were raised above the surface by placing blocks of wood at convenient points. This insured the free circulation of the vapour over the whole surface of the objects. A dozen small saucers, with pieces of sponge saturated with carbolic acid, were distributed about the bottom of the case.

The carbolic acid was renewed every three or four days for a month, and a strong vapour pervaded the case for that period, during which there was no appearance of worms, dead or alive. At the end of May the saucers were removed, and the doors of the case thrown open, so

that it might be well ventilated and cleared of vapour, after which it was closed again, but the saucers were not replaced. This closing of the case without using the vapour was to prevent the escape of any beetles which might make their appearance in the event of the vapour of the carbolic acid not having destroyed the worms. About the middle of June, a fortnight after the case was closed again, beetles were seen crawling upon the white paper with which the bottom was covered. These beetles would, no doubt, deposit their ova in the usual course, and as they could not escape, a considerable number of them were found dead upon the white paper with which the surface underneath the carved work was covered.

In order to test the efficacy of chloroform and benzine, two small glass cases, as nearly air-tight as possible, were selected, in which were arranged, early in May, specimens of ornamental wood-work, all more or less in bad condition from the worm. The bottom of each, as in the previous experiment, was covered with white paper, and the objects to be acted upon raised upon small blocks of wood. In one case chloroform was used, and in the other benzine, in a similar manner to the carbolic acid.

Within a week after the experiment commenced it was evident that the action of the chloroform had destroyed the worms as they came to maturity, and in a fortnight all the specimens of carved work having been taken from the case, and the dust produced by the action of the worms shaken out, a number of dead ones were found, as also some dead beetles; but these were evidently those of past seasons.

On examining the specimens of carved work placed in the case treated with benzine, there was no appearance of worms or beetles dead or alive. The two cases, with their contents, were then kept open for a week, and thoroughly ventilated to clear them as far as possible of all fumes of either chloroform or benzine.

After this they were closed again, being then free from all traces of vapour, and they have been kept closed ever since. Throughout the summer, the temperature being the same as that under which beetles appeared in the case treated with carbolic acid, no traces of worms or insects were visible, nor could the remains of any be discovered on the white paper, with which the lower surface of each case was covered. It would appear then that the action of the vapour of carbolic acid is not sufficient; whilst chloroform and benzine are volatile and penetrating. The experiment with chloroform appears to prove that the vapour kills the worm, and as no beetles appeared in the case during the summer, it may be inferred that it killed all the worms within its influence.

The Commission infer that benzine is more effective than even the chloroform. It certainly might have happened that there were no ova in the articles placed in the case treated with benzine, and therefore there would be no worms developed to kill; but this is not probable from the condition of the specimens and the statement of the attendant in whose charge they had been in the Museum.

As regards saturation, the experiments were made with corrosive sublimate, dissolved in methylated spirits of wine, as suggested by the Chairman; the object being to ascertain the effects of this upon the surface of the wood, as regards grain and colour. The solution was mixed to the strength of half an ounce of corrosive sublimate in half a pint of methylated spirit, but this was evidently too strong a solution. One experiment was upon a small carved and fluted column which had been varnished or partially French polished. The specimen had been already submitted to the action of the vapour of chloroform. The result on the surface was simply to slightly disturb and renovate the varnish or polish. Another experiment was made upon a portion of an ancient wood cornice which had been placed in the case in which the carbolic acid had been used. The decorated portion had originally been stained and varnished, but the specimen was bare at the back. The whole was saturated with the mixture by laying on with a house-painter's sash tool. The visible effect upon the stained and varnished surface was simply to renovate the varnish and stain. A third experiment was upon a piece of carved poplar, which was free from all surface treatment and just as left by the carving tool. The grain of the wood was not raised by the solution; but after it was dry, the carving had the appearance of having been varnished. This would be decidedly objectionable in all cases in which it might be desirable to preserve the original colour and unpolished surface of the wood. No experiment as to the effect of saturation in a solution of corrosive sublimate in water, as used by Mr. Rogers at Belton, was made. Because of the great risk to delicate carvings or pieces of furniture by their immersion in water, or the bringing up of the grain of the wood by treatment with a brush; and because the vaporisation by benzine appears to be quite sufficient to destroy the larvæ, whilst the methods suggested under the head "Prevention" appear likely to accomplish the object of warding off future attacks.

On the subject of restoration, the facts communicated by Mr. W. G. Rogers are the most important, and may be considered as decisive as to the practicability of restoring the most delicate works to as nearly as possible their original condition, and even by this restoration rendering them proof against the attack of the larvæ in future. In 1855 the carvings by Grinling Gibbons, at Belton House, were in such a condition as to render it absolutely necessary that something should be done to prevent their complete destruction. To this end, they were placed in the hands of Mr. W. G. Rogers, who reports that the first step he took was to have the various pieces photographed, as a means of recording the position of each detail of the ornamentation, &c. The whole of the works were in a serious state of decay, portions being completely honey-combed by the worm. In order to destroy or prevent any future development of the insect within the wood, Mr. Rogers caused the whole to be saturated with a strong solution of corrosive sublimate in water. The colour of the wood, however, suffered so seriously by the action of the mercury, that it was found necessary to adopt some means of restoring the original tint. This was effected by ammonia in the first instance and subsequently by a slight treatment with muriatic acid. After this, the interior of the wood was injected with vegetable gum and gelatine, in order to fill up the worm holes and strengthen the fabric of the carvings. A varnish of resin, dissolved in spirits of wine, was afterwards spread on the surface, and then the dismembered pieces were put together, in conformity with the photographs taken as records prior to the work of restoration having been commenced.

The present condition of these carvings, seven years after the operations detailed had been completed, is reported as completely satisfactory.

As regards the prevention of decay or attack by the insect, the saturation with spirits of wine and corrosive sublimate, as proposed by the chairman, from giving the effect of a slight varnishing it would, in many cases, be objectionable. From experiments tried by Mr. Peter Graham, it appears the desired object can be attained without in the slightest degree changing the appearance of the surface of the wood. Mr. P. Graham caused specimens of carving, on which no preparation whatever had been used, to be coated with thin, clear, parchment size, such as that used by gilders and others. This, being an animal substance, is not attacked by the worm, which feeds on vegetable matter. The specimens experimented upon by Mr. P. Graham showed no appearance of any surface treatment after having been gone over with the size.

The Commissioners, however, suggest that it would be desirable to mix a small quantity of corrosive sublimate with the size before applying it, in the proportion of say sixty grains to a pint of the size.

The conclusions at which the Commission arrived are,

1. That the action of the worm may be arrested and the worm itself destroyed by vaporisation, more especially by the vapour of the benzine, as appears from the experiments reported, and also from the successful results arrived at in the Bodleian Library, at Oxford, in the destruction of the book worm.

It would be advisable to have a room, sufficiently large to take in any piece of carved work or furniture which may be required by the museum, which may show symptoms of decay. This room should be so constructed that it can be closed and made as perfectly air-tight as possible, but with means of renewing the benzine placed in saucers from time to time as it evaporates, without opening the ordinary means of access or entering the chamber; as also of ready ventilation after the objects are considered to have been sufficiently treated, and before any person enters the room for the purpose of removing them.

The process must always be carried out during the spring and early summer months, according to the state of the temperature and the observations of those in charge of the carved work, as to the action of the worm, which is manifested by the fine dust falling from the worm-holes, crevices, &c.

2. That the practicability of complete restoration of carved work is fully shown in the results of Mr. Rogers' labours at Belton, as detailed. The important question, however, as to the restoration of gilded carved work, and of panels on which pictures have been painted, and which have been attacked by the worm, presents difficulties which, at present, there seems to be no means of overcoming; as in neither case could the objects be immersed in water, or submitted to the action of gelatine. That the worm could be destroyed by vaporisation, as in all other cases, appears certain, and there is no reason to suppose that the vapour of the benzine would influence either the gilding of the one or the colours of the other, especially if applied in the latter case to the back of the picture.

3. That after the worm has been destroyed by the course of action proposed, further attacks from it can be prevented by treating the carved work with a solution of corrosive sublimate, either in methylated spirits of wine, or parchment size, according to the surface character of the carving or wood-work; the strength of the solution, in each case being, as before stated, 60 grains of the chloride of mercury to a pint of fluid, whether spirits of wine or parchment size.

In a note appended to the report by Mr. George Wallis, it appears that the cases treated with chloroform and benzine were kept for observation throughout the spring and early summer months of 1864. As there appeared to be some action going on in the first named case, the final examination of both cases was deferred until 1st August. In the case in which chloroform had been used, the worms had been active, especially in one piece of wood work, as a considerable amount of dust fell from it when shaken, and a number of newly made holes were distinctly visible. No beetles could be discovered, nor were any worms found which could be considered as the development of this year, although several fell from the holes, evidently of last year's growth, as they were very dry. Nine small objects in carved wood had been placed in the case treated with benzine, in which, as stated in the report, no appearance of life was manifested in 1863. On examination, eight of these were again found without the slightest appearance of new dust, although all of them had been seriously worm-eaten before placing in the glass case. The ninth specimen, in poplar or willow, had evidently been the subject of their operations. The dust inside showed that the worms had been developed this year, and had attacked the top and sides of this casket, whilst four dead beetles were found, three inside the casket, and one a few inches outside of it on the white paper with which the bottom of the glass case remained covered. All the operations of the insect in this glass case had been confined to this casket; neither dust, dead worms, nor beetles, were found in or near any other object. The glass case on being opened smelt strongly of the benzine, although it had been left open for a period in 1863, as stated in the report. From these facts it would appear that the ova deposited previous to the objects being subjected to the action of chloroform or benzine, were not all developed in 1863, the season in which the experiments were made; and that in any future action based on the experiments reported, this fact should be taken into account, and the vaporisation repeated more frequently than would otherwise have been necessary if all the ova of one year were developed and came to maturity in the next.

Proceedings of Institutions.

BACUP MECHANICS' INSTITUTION.—The distribution of the Prizes and Certificates won by students of this Institution in the Science and Art Department, Society of Arts, and Lancashire and Cheshire Union Examinations, took place on Thursday, October 20th, Mr. J. Greaves in the chair. The chairman delivered the prizes to the successful candidates in the following order:—Alfred W. Andrews, Lancashire and Cheshire Union; certificate. William H. Barr, Science and Art Department: Inorganic Chemistry, 1st class Queen's Prize; Organic Chemistry, honourable mention. Society of Arts: Chemistry, 3rd class certificate. James Greenwood, Lancashire and Cheshire Union; certificate. James Grime, Lancashire and Cheshire Union; certificate. William Lord, Science and Art Department: Inorganic Chemistry, 1st class Queen's Prize; Organic Chemistry, 2nd class Queen's Prize. Society of Arts: Arithmetic, 1st class certificate; Algebra, 2nd ditto; Chemistry, 2nd ditto. John Lord, Society of Arts; Arithmetic, 3rd class certificate. James Morton, Society of Arts: Arithmetic, 2nd class certificate; Chemistry, 2nd ditto. Henry Nuttall, Science and Art Department: Inorganic Chemistry, 1st class Queen's Prize; Organic Chemistry, 3rd class ditto. Society of Arts: Arithmetic, 2nd class certificate; Chemistry, 3rd ditto. John Robert Pilling, Lancashire and Cheshire Union, certificate. William Pilling, Lancashire and Cheshire Union: certificate; Arithmetic, prize £1. James Pilling, Society of Arts: English History, 3rd class certificate. John H. Rakestraw, Lancashire and Cheshire Union: certificate. Joseph Shepherd, Lancashire and Cheshire Union: certificate. Geo. Wm. Sutcliffe, Lancashire Union: certificate. Science and Art Department: Inorganic Chemistry, 1st class Queen's Prize; Organic Chemistry, 3rd class ditto. George Howarth Stewart, Science and Art Department: Inorganic Chemistry, 2nd class Queen's prize; Organic Chemistry, passed. Robert Stewart, Science and Art Department: Inorganic Chemistry, 3rd class Queen's Prize; Organic Chemistry, passed. Society of Arts: Arithmetic, 3rd class certificate; Chemistry, ditto. Robert Stewart, Society of Arts: Arithmetic, 1st class certificate; Algebra, 3rd ditto. James Howker Smith, Society of Arts: Arithmetic, 3rd class certificate. John Whitaker, Lancashire and Cheshire Union: certificate. Joshua Lord Wolfenden, Science and Art Department: Inorganic Chemistry, 2nd class Queen's Prize; Organic Chemistry, honourable mention. Society of Arts: Chemistry, 3rd class certificate. James Walsh, Science and Art Department; Inorganic Chemistry, 2nd class Queen's Prize; Organic Chemistry, 3rd class ditto. Society of Arts: Arithmetic, 3rd class certificate; Chemistry, 3rd ditto. Several recitations were given, and the Newchurch hand bell ringers played some pieces of music. Votes of thanks were given to the chairman and others, which brought a good evening's entertainment to a close.

NEWPORT ATHENÆUM.—The monthly journal of this Institution states as follows:—"It has recently been pro-

posed to the directors of the Newport Athenæum to take the necessary steps for the formation of a Local Board of Examiners in this town, in connection with the Society of Arts. The proposal is one that demands attention, and we are assured that the directors will be quite prepared to proceed in the matter, when a sufficient number of members have signified their desire to become candidates at the approaching examination."

Fine Arts.

ROUEN DEMOLITIONS AND IMPROVEMENTS.—It is next to impossible to let light and air into a town, to convert crooked alleys into straight and wide streets, to create open spaces where, previously, a mass of old houses was intersected by narrow and tortuous lanes, without giving offence to the antiquarian, and running the danger of being called Iconoclast by the archæologist. Whether the site be London, Paris, or Rouen, the improver must be prepared, not only for opposition from those who are invaded, but also for complaints from those whose reminiscences and sympathies are interfered with. The Iconoclasts, if so they must be called, of Rouen, will not escape the usual fate; they will be accused of destroying what can never be replaced, and of having substituted modern common place for picturesque antiquity; yet they seem to have been as considerate as possible in the matter, and never to have obliterated a worthy specimen of antiquity except where the health, necessities, or conveniences of living men, women, and children absolutely demanded it. Besides secondary alterations, two fine new streets, at right angles to each other, and forming a cross of which the long arm runs almost due north at right angles to the river, and, on the map, reminds one of the "signature" of William the Conqueror, or Richard Cœur de Lion, on the old charters referred to last week, have been driven through the very heart of the old town, and at the intersection of this cross is a large square, planted with great taste, and christened Place Solverino. On this spot existed some of the oldest houses in Rouen; and where now are brilliant grass plots, trim gravel paths, shrubs and flowers in gay luxuriance, and many of which would have recalled to the eye of Richard Cœur de Lion the lands of his brave antagonist Saladin, and cast iron garden seats for the good folks of the nineteenth century, a few years since was a mass of picturesque houses which could scarcely be called habitations, and streets which scarcely deserved the name of thoroughfares. Many very curious and some beautiful old fronts and gables have been demolished, but there is no help for it, and the student must look for them now in the illustrations of books, in the delightful works of a Turner or a Prout, or in the more matter of fact productions of the camera. But if the demolitions have obliterated a good deal of what was curious and interesting in Rouen, it has brought many of the great attractions of the place out of shadow, and has facilitated access to them. The glorious church of St. Ouen now stands between a beautiful pleasure ground and a large place at the end of one of the new streets, and if the Hôtel de Ville, an ugly building, in *quasi*-Corinthian style—an old convent with a modern face—did not abut against the north transept of the church, the latter would be exhibited in all its grandeur and beauty. A secondary street throws open to view the curious church of St. Maclon with its beautiful painted windows. The tower of St. Laurent, perhaps the finest in Rouen, is also disengaged from the buildings which formerly half hid it from view; and St. Godard, St. Patrice, the picturesque Palais de Justice, St. Vincent, the tower of the renaissance church of St. André; the famous old belfry, the *Tour de la Grosse horloge*, commenced, as the quaint old inscription says, in "MCCCXXIIII. and nine," and finished in "MCCCXXIIII. and eighteen,"—a roundabout method of writing 1333 and 1342—and many other remarkable buildings, are on or near to the line of these two principal new streets, and are thus rendered far more accessible for the visitor. These two grand streets are named the *Rue de l'Imperatrice*, and the *Rue de l'Hotel de Ville;* they form the principal features of the new town, and their architecture is not unworthy of the locality which they bisect. The authorities have not fallen into a servile imitation of the streets of Paris, but have selected a style of building which is peculiarly suitable to the habits as well as the character of the town. The houses are not, like those of Paris, composite buildings, divided into apartments for the accommodation of a dozen or more families, but are, with few exceptions, single residences, and, consequently, on a much smaller scale than those of the capital. The style almost universally adopted is that of late renaissance, in red brick of excellent quality, relieved, very liberally, by facings of Caen stone, and although, as a rule, the houses are not much ornamented, the doors, balconies, and other conspicuous features are treated with much boldness, and generally with good taste. On the whole New Rouen, although totally unlike, is not unworthy of the capital of Normandy, and when completed will do honour to its renovators, who have had extraordinary difficulties to cope with, smallness of means being one of the greatest. Visitors to France will do well to break their journey and give a few hours at least to the new town, the old edifices, the museums, and the Galleries of Rouen, not omitting, beyond everything, the famous old Hôtel de Bourgtheroulde in the Place de la Pucelle, where Jeanne d'Arc is said to have been burned. Montfaçon, Ducarel, Dibdin, Cotman, and Dawson Turner have all dwelt lovingly on this remnant of the middle ages; De Joliment, Nodier, Taylor, and de Cailloux have made known its beauties by graver and pencil; and Le Provost and Barabe have made it the subject of special memoirs. It was commenced about the end of the fifteenth century, by Guillaume La Roux, Lord of Bourgtheroulde, who was alive in 1486, and finished in the early part of the following century by his son, also Guillaume, who was Abbé of Aumale and of Val Richer, and was employed by François I. in the negotiation of the Concordat. The building consists of a house in the peculiar style of the period, and another building at right angles with the former, evidently more recent, and apparently erected to supply the want of large state rooms in the former. The fronts of both are covered with sculptured bas-reliefs, executed on the walls themselves. The subjects in the original house are chiefly pastoral, and are disposed over the walls in almost as free a style as the ornaments on a Japanese cabinet, but the sculptures on the subsidiary building are arranged in a regular manner. The front of the last-named portion consists of a door and three windows, all highly decorated, and beneath the latter are large bas-reliefs of the famous meeting of Henry VIII. and François I. on the field of the cloth of gold. The outer panels represent each of the monarchs with their retinue, while that in the centre exhibits their meeting. Over the windows is a sculptured frieze, the subjects being evidently scriptural or allegorical. Altogether the Hôtel de Bourgtheroulde is one of the most remarkable buildings of its period, and is, moreover, in very good preservation, although it has fallen from the condition of a noble residence to that of a house of business. The interior has suffered terrible changes, but one small octagonal chamber on the first-floor in the tower, forming a part of the older portion, is in good preservation, and its carved woodwork and decorated ceiling present excellent examples of the interior ornamentation of the period.

PHOTOGRAPHY.—The Photographic Society of London has just distributed among its members a reduced copy of Mr. Robinson's composition photograph—"Bringing Home the May."

THE NATIONAL GALLERY.—The National Gallery has just been enriched by the magnificent gift of Lord Taun-

ton of his celebrated picture of the Annunciation, by Carlo Crevelli, signed and dated 1481. The other acquisitions during the vacation are—a portrait of Christofero Longono, a Milanese nobleman, by Andreo de Solario, dated 1505; "St. Rock with the Angels," by P. Morendo, dated 1518; and a portrait of a Venetian Senator, by Bonsignori, signed and dated 1487. The gallery will be re-opened to the public on Monday, the 7th instant.

Manufactures.

LARGE LOCOMOTIVE.—The late Mr. Stephenson constructed a powerful locomotive for mounting sharp inclines and turning curves of small radius, by coupling two engines back to back; each of these weighed about twenty-seven tons, and the locomotive thus constructed drew double its own weight at the rate of twelve miles an hour. Such is the account given by a French engineer of the locomotive in question. M. Petiet, chief engineer of the Chemin de fer du Nord of France, has recently constructed a locomotive with the same object; in this case two engines are united in one machine, having four cylinders and twelve wheels coupled. It has no tender, and carries its own fuel and water, and when loaded weighs in round numbers sixty tons. The heating surface is equal to about 265 square yards. This locomotive is said to have drawn a train, weighing 250 tons, a distance of nearly 4,000 yards with several gradients, of which the sharpest was eighteen in the thousand, with three curves of little more than three hundred yards radius. M. Petiet says that it could act perfectly on a curve and counter-curve of 135 yards diameter in a distance of little more than 200 yards. After the above experiment in traction had been made, the locomotive was placed at the rear of the train, and pushed the train backwards over the same ground with perfect ease. M. Petiet believes that if it were ever necessary to work curves of eighty or ninety yards radius only, it would simply be necessary to augment the amount of play given to the two central axles of the machine carriage. The experiments were accompanied by a difficulty which arose from the construction of the bridges, which were not high enough to permit the engine to pass through without lowering its chimney. The trials took place in the presence of the Government Engineers of Roads and Bridges. The railway from Turin to Genoa, for which we believe this engine has been constructed, has inclines as great as 35 in the 1,000, but the report says nothing about the capacity of the new locomotive in such cases.

EXPLOSIVE MATERIALS.—A very interesting operation, which attracted a great number of spectators, was performed recently, at St. Ouen, near Paris. A large floating dock on a new construction—210 feet long, 36 feet wide, and 18 feet high—was launched on the canal. This great iron boat, or floating dock, is intended for a store, to hold all descriptions of spirits, oils, or other inflammable liquids. These substances, which are so frequently the cause of disastrous fires on land, are now to be secured on water, where they will be comparatively safe from fire. Each of the 100 compartments into which the iron boat is divided is sufficient to contain 250 hectolitres. Ten similar floating warehouses are to be built for the company of the docks of St. Ouen, of which five are already on the stocks. The iron boat was launched sideways into the canal of St. Ouen. After having glided along the slides placed under it, the iron mass, once in the water, moved forward more than forty yards by the force of impulsion. The operation was performed with complete success.

CANADIAN EXHIBITION.—The annual provincial exhibition of Upper Canada was held this year at Hamilton, on the last four days of September. About 30,000 persons paid for admission. The articles exhibited were more than 6,000 in number, the live stock exceeded 2,000; but the exhibition included also not only agricultural implements and farm products, but manufactured goods of all kinds' works of fine art, and ladies' work. Of the reaping and mowing machines the judges reported that though there was considerable difference in the quality of the work done, it was all well done; the machines, as a whole, wrought well, no breaking down, no total failures. The samples of grain exhibited were pronounced extremely good, and the judges considered that the statements generally made of the failure of crops must have been somewhat exaggerated. The president, Colonel Johnson, in closing the exhibition, gave a statement (from the return apparently of 1860 or 1861) that the production of grain, peas, beans, and potatoes in the State of New York amounted to 27 bushels per head of population, in Pennsylvania 32 bushels, in Michigan 42, in Ohio 49, but in Upper Canada nearly 56 bushels per head. He stated that the season just closed had shown the importance of drainage. The farmers who had their lands drained were able to get in their crops at a time when soils undrained could not be worked at all in consequence of the spring rains; and it was remarkable how slight the effects of the drought of this summer had been upon drained land as compared with undrained. But the yield, he said, taking all the various productions of the field into account, is likely to prove somewhat below the average.

ENORMOUS SHEFFIELD CASTING.—In July last a successful attempt, by Messrs. J. M. Stanley and Co., the Midland Works, was made to cast an anvil block weighing 160 tons. The enormous mass of iron took six weeks to cool, and it was then, by means of hydraulic power, lifted from the mould. Last week the same firm were engaged in casting a second anvil of precisely the same size and weight. The mould, which was twelve feet square at the base and eleven feet six inches deep, was dug out in the centre of the workshop, and from five furnaces constructed at intervals round the building, the molten iron was run. The first furnace was "tapped" at six o'clock in the morning, and in about twelve hours the mould was filled. The opportunity was embraced by Messrs. Stanley for testing their newly-patented rotary engine. An ordinary engine of 12-horse-power was used to drive a portion of the blow-fans. It was worked at a pressure of 80lbs., and the fans made 1,400 revolutions per minute. The new engine, which is of 10 horse-power, drove fans of the same dimensions, was worked at the pressure of 50lbs., and the fans made 1,600 revolutions per minute. The new engine worked much easier than the one on the old principle, and consumed about half the quantity of fuel. The enormous castings referred to are intended for the gun manufactory of Messrs. Firth and Sons. For months past men have been engaged preparing for them "beds" of extraordinary solidity, the necessity for which will be apparent when it is known that each anvil has to receive the blows of a twenty-five-ton Nasmyth hammer. Extensive alterations are going on in the steel melting department at the works of Messrs. Firth. The building intervening between the steel melting furnaces has been removed, and other furnaces in its room erected. When completed, there will be, in a space of 160 feet long by 60 feet wide, 170 melting pots, and an ingot of steel of from twelve to fourteen tons weight will be turned out at one casting. In the centre of this department will be erected a powerful steam crane.

PARIS EXHIBITION OF 1867.—It is not absolutely settled where this coming Universal Exhibition is to be held. There was a general impression abroad that the building commenced by the unfortunate Permanent Exhibition Company, at Auteuil, would be made available for the purpose. It is admirably situated for such a purpose, standing as it does at the junction of three main roads: a railway, an American tramway, and the river; while the foundations and a considerable amount of the stone and iron work are executed. The Champ de Mars has been under consideration of the authorities, but there is probably an objection to shut up so fine a theatre for

military exhibitions for one to two years; and now it is said that it is probable the site of the exhibition of 1855 will be again employed. But the Palais de l'Industrie is much too small for the purpose, and large annexes would be absolutely necessary. It will be remembered that on the former occasion the machinery was placed in a long building erected on the Quai de la Conference, that a large circular building, formerly a panorama, which stood between the two, was also used, and that all three were united together by means of the garden, and a wooden rialto, which passed over the ordinary road and the tramway. There are two great objections to a repetition of this arrangement, namely, the cutting up of the Champs Elysées, which have been beautifully planted since 1855, and the interruption of the traffic along the quays. The Parisian public was rather surprised the other day by a statement to the effect that the building for the 1867 exhibition would be built over the Seine, and, strange as it may appear, the rumour is not unfounded. M. A. Barrault, formerly engineer-in-chief of the Palais de l'Industrie, has written to the editor of the *Opinion Nationale*, protesting against the project attributed to him, of placing the new building under a tunnel, covering the Seine from the Pont d'Alma to the Pont de la Concorde (a distance of full 4,000 feet), but he admits that he is occupied on a plan, of which the scheme has been presented to the Emperor, and of which the following is an outline:—M. Barrault proposes to make use of the Palais de l'Industrie, and to erect additional buildings over the Seine, which flows at little more than 200 yards from the building in question. He proposes to cover the Seine to the extent of 350 mètres, or more than a thousand feet, by means of wood-work nearly level with the quays, which are much higher than the level of the river, and supported by beams resting on piers built in the stream; this erection to be connected with the Palais de l'Industrie by means of a large covered gallery crossing the public road and the quays. One advantage claimed for this curious arrangement is that the public will have means of direct access to the exhibition on each side of the river.

Commerce.

POSTAGE BETWEEN FRANCE AND ENGLAND.—This subject is still discussed, and as the consideration of points connected with it may aid in the establishment of a more liberal arrangement, it is well to keep the public mind informed upon the subject. The French press has echoed the complaints of the public on several points, and the authorities have felt compelled, at last, to reply to the various statements and queries put forth. As regards the demand for an increase of weight for letters passing between England and France, the official note says, in reference to an article in the *Debats*, "The writer asks how stands the negotiation between the two countries with respect to the postal tariff, and states that England proposes fifteen grammes (½oz.) for the initial weight of international letters, now fixed at 7½ grammes. In this case again no negotiation is on foot. The English office would doubtless gladly accept the weight of half an ounce (a little less than fifteen grammes), but this could not be accepted by France, as the standard of weight for a single letter on the one hand, because it does not correspond with any division of the metrical system, and on the other, because France, having adopted the weight of the gramme for its inland service, cannot accord to strangers what she refuses to her own population." The latter portion of this reply has some weight, but it is inconceivable how any one in authority could pen the former part relative to the fifteen grammes, when that is just the weight used for Paris and the whole of the department of the Seine, which supplies a vast proportion of the whole correspondence of the country, and is, moreover, used, with its multiples, over and over again in the scale of charges for printed matter. When the official writer points to the fact that a newspaper costs a penny for the shortest postal distance in England, and only eight centimes when sent "from Marseilles to the Orkneys," and that while the French post-office carries a small printed circular for one centime, the English office charges a penny, or ten centimes, for the smallest scrap, it is clear that the post-offices of the two countries are neither consistent with each other nor with themselves, and the sooner they become so the better will it be for the commerce, the private interests, and the revenue of both countries.

STEAMERS AT PANAMA.—There are already no less than nineteen steamers a month arriving at and departing from the Isthmus of Panama, viz.:—The regular line from New York; two lines from Europe; steamers from Carthagena and Nicaragua; steamers running on the South Pacific coast and on the coast of Central America, besides lines to California. The Central American line has just been obliged to add a third steamer of larger capacity. By another year cotton will probably become an important staple in nearly all the Southern republics.—*Panama Star.*

TRAFFIC RETURNS.—The traffic receipts of railways in the United Kingdom amounted, for the week ending the 8th October, on 11,596 miles, to £688,405, and for the corresponding week of last year, on 11,261 miles, to £622,450, showing an increase of 335 miles, and of £65,946 in the receipts. The gross receipts on the fourteen principal railways amounted, in the aggregate, on 8,216 miles, to £561,060, and for the corresponding week of 1863, on 7,994 miles, to £507,325, showing an increase of 222 miles, and £53,735 in the receipts.

TRADE WITH FOREIGN NATIONS.—The Select Committee appointed to inquire into the arrangement between the Foreign Office and the Board of Trade in reference to the trade with Foreign nations, have considered the matters to them referred, and have agreed to the report. They come to the conclusion that the mode of procedure must be by the Foreign Office consulting the Board of Trade, and upon that supposition they had brought before them two suggestions:—1st. That there should be, within the Foreign Office itself, an officer or officers who should take special charge of the correspondence of the Board of Trade; and 2ndly. That the Board of Trade should be put in direct communication with the members of the consular and diplomatic services upon commercial matters. The committee continue:—Upon the first of these suggestions different opinions have been expressed, but, after carefully weighing them, your committee are of opinion that such departmental change would be of service. To the second of these suggestions the committee have devoted much of their time; on the one hand, the advantages of direct communication between the department whose duty it is to promote commerce and those servants of her Majesty whose duty it is to watch the interests of such commerce abroad are self-evident. On the other hand, inasmuch as the members of the consular and diplomatic service must be appointed by the Foreign Office, it may be inconvenient for them to be in communication with any other department. Your committee, however, agree with the Earl of Malmesbury, and with Sir Emerson Tennent and Mr. Mallett, the two gentlemen who have the charge of foreign commerce at the Board of Trade, in the belief that there will be no danger of collision between the two offices if all correspondence with consuls and foreign ministers pass through the Foreign Office, so that the Foreign Secretary could acquaint the President of the Board of Trade if the instructions of the latter be at variance with his own. Your committee think that if the Board of Trade were thus enabled to carry on communication through the Foreign Office, that department would be more quickly informed of such facts as it is its duty to public; would be able more speedily to serve the interests of individual merchants; and, in transactions in which its opinion is asked by the Foreign office, to obtain that full information

without which its opinion is of little value. Your committee conclude with the following recommendations for the improvement of the relation of the Foreign Office to the Board of Trade:—1st. That the Board of Trade be placed more nearly upon an equality with the Foreign Office than it is at present, in order that its opinion, when asked, may have due weight, and that its chief be always a member of the Cabinet. 2ndly. That the Board of Trade be put in direct communication with the members of the diplomatic and consular services, and that such communication be carried on through the Foreign Office, with such provisions as shall prevent collision. Lastly. That an office or officers be appointed in the Foreign Office to conduct its correspondence with the Board of Trade.

CALAIS HARBOUR.—It has long been felt that the basin of Calais is far too small for the commerce of the port; in fact, it is so small that vessels have sometimes to wait for weeks, to the great cost and inconvenience of their owners, before they can land their cargoes. A project for enlarging the port has been drawn up for some time, but military considerations have heretofore stood in the way. It is said that these have now all been removed, and that the work will be proceeded with immediately. The extent of the floating basin will be nearly doubled, and the quays will be increased from 530 to 1,100 mètres in length, when, it is calculated, there will be room for the reception and unloading of all the vessels that arrive even in the busiest part of the year.

ANIMAL MANURE MANUFACTURE.—The *Chemical News* says:—"In the *Journal d'Agriculture Pratique*, M. Barral gives some interesting details on the subject of the manufacture of animal manure at Aubervilliers. This manufactory consumes every year 8,000 horses, 200 donkeys, 300 cows, 300 pigs, 9,000 cats and dogs, 6.000 kilogrammes of meat unfit for food, 500,000 kilogrammes of offal from the Parisian abattoirs, and 600,000 kilogrammes of other refuse animal matters, such as skins, horns, &c. The raw material is first cut up and boiled to extract the grease. The flesh is then separated from the bones, pressed, and dried. It is afterwards ground and sifted, and the dried bones, which are also submitted to the same process, mixed with it, forming a manure containing 35 per cent. of nitrogen and 55 per cent. of phosphate of lime. The blood is collected separately, and also made into manure. The soup obtained in the boiling is strained, and the solid matter thus collected is added to the rest. The offal is piled in alternate layers with other organic matter, such as wool and parings of horn and hoofs, with which is mixed a certain amount of mineral phosphates. The heap is well moistened with the strained soup, fermentation is set up, and the whole is gradually transformed into excellent manure. During this process the phosphate of lime breaks up into phosphoric compounds, more or less soluble, and various salts of ammonia are formed. This is really a much better use to put dead horses to than making them into *saucissons de Lyon* or *filets de bœuf* for the cheap *restaurateurs*.

COAL IN FRANCE.—Although extensive coal mines have been discovered in the department of Calais, during the last few years, the import of English coal does not in any way diminish. The following statistics will serve to show the increase in the consumption of coal in France during the last 75 years, in tons—

	Consumption.	Imported.
1789	500,000	220,000
1811	773,000	.....
1830	2,400,000	600,000
1840	4,290,000	1,290,000
1845	6,200,000	2,200,000
1852	7,900.000	3,000,000
1860	13,600,000	5,200,000
1863	15,200,000	5,200,000

It will thus be seen that of the 15 million tons of coal annually consumed in France, about two-thirds (valued at £4,712,000) are obtained in the country itself. France, however, cannot claim to be a coal-producing country, the quantity extracted in Belgium being of equal amount, and the Zollverein exceeding her, varying from 14,000,000 to 17,000,000 tons annually, whereas England, which produced 13,000,000 tons only in 1800, furnished 84,500,000 in 1862, representing a value of nearly £22,000,000. The coal districts, however, in the Pas de Calais may be said to be in a prosperous condition, the quantity produced in 1859 having been 504,390 tons against 1,192,200 tons in 1863.

Colonies.

ACCLIMATISATION.—The following paper was read at a recent meeting of the Acclimatisation Society of Victoria:—I think it may not be unserviceable to remind those who regard acclimatisation as the new-fangled hobby of a few crotchetty enthusiasts, that it has been practised in England for a period of 1200 years—dating from the time at which the first wheat was sown in her soil—and that, up to the commencement of the sixteenth century, at which period great efforts seem to have been made for the introduction of exotic flowers, fruits, and vegetables, the mother country was singularly destitute of all these, her population subsisting, as some of the early settlers of this colony did, upon beef, mutton, and "damper." Indeed, there is a striking similarity between the condition of England in the dawn of her civilisation and that of Australia at the present time. She was both a pastoral and a gold-producing country; and her exports consisted of gold, silver, tin, copper, wool, and horses. Not to pursue this parallel further, however, I will at once proceed to point out what acclimatisation has done for England in regard to fruits, flowers, and esculents. The very rose which we adopt as a national emblem, and profess to consider so purely English, is an alien, and was brought over from France, Flanders, and Italy. The honeysuckle which garlands the hedgerows and overruns the porch of the peasant, came originally from North America; while the lavender which the farmer's wife deposits among her snow-white napery in the household linen-chest, is a native of the south of Europe. So, too, are the rosemary, the mignonette, the lily, and the pink. English shrubberies are indebted to Hungary for the "golden tresses" of the laburnum, to Portugal for the laurel, to Italy for the bay tree, and to the Levant for the weeping willow. The common daffodil, "that comes before the swallows dare," is of Italian lineage; the wild foxglove is a denizen of the Canary Isles, and the passion-flower, with its sacred symbols, is a native of South America. In fact, if you were to strip our English flower gardens, green lanes, woods, and meadows of their exotic decorations, you would rob them of half their beauty, and English descriptive poetry of half its charm. Even the hawthorn, so indispensable to the sylvan poet and the landscape painter, is derived from North America. To the best of my belief, England does not possess so much as one indigenous vegetable; and, until the time of the Tudors, what little garden stuff her scorbutic population did consume was imported from the Netherlands. You may remember that Shakspeare makes Sir Andrew Ague-cheek account for the dulness of his mind by observing, "I am a great eater of beef, and I believe that does harm to my wit;" and, in the absence of any succulent vegetables, his excessive consumption of animal food is not at all surprising. Nor, considering their very restricted sort of diet, can we feel much surprise at Queen Elizabeth's robust maids of honour making such heavy meals of bread, beef, and beer as they are reported to have done. About this time, however, it seems to have occurred to our beef-eating, beer bemused, and slow-witted forefathers, that it would be cheaper to import garden seeds than vegetables, and more wholesome to eat newly-cut cabbages than to feed upon such half-rotten garbage as was brought

over from Holland in the holds of broad-bottomed and slow sailing luggers; and having once opened their minds to this conviction, they began to cast their eyes over the four quarters of the world in search of vegetables. So, in course of time, they procured broccoli, beans, and cauliflowers, from Greece; peas from Spain; carrots and celery from Flanders; asparagus and kidney beans from Asia; lettuce, artichokes, and cabbage from Holland: parsley from Egypt; and potatoes from South America; and thenceforth the kitchen garden formed as indispensable an appurtenance to the mansion and the manor house as the pleasaunce, the buttery-hatch, or the bowling-green. Of indigenous fruits also, Old England was lamentably destitute. All she could boast of was a few crude berries, growing wild upon brambles, for I am doubtful whether even the crab was native to her soil. Most of the fruits which now flourish in her gardens, hothouses, and orchards (none of which fruits, by the way, are said—upon the authority of Mr. Hawthorne—to be comparable in flavour with an American turnip), were introduced between the years 1520 and 1600. Italy sent her the mulberry; Syria, the apple and the plum; Portugal, the grape; Persia, the nectarine and peach; Flanders, the gooseberry, the finer descriptions of cherry and the strawberry; Greece, the currant and the apricot; Austria, the quince; Spain, the pomegranate and the "oranges and lemons," so popularly associated with "the bells of St. Clement's;" and North America, the raspberry and the walnut. It was early in the same century, too, that England borrowed from the Netherlands, and planted in her southern counties the most beautiful, and withal the most useful, of all creepers—the hop plant. Imagine the condition of the people of England without bitter beer!—and without the means of brewing it, unless by the employment of obnoxious and unpalatable drugs! The beverage which has immortalised the names of Bass and Allsop, which has been the means of strewing the summit of the Rhigi and the slopes of the pyramids with the vitreous evidences of John Bull's ubiquity; which has made the tropical heat of an East Indian summer endurable; which has imparted its own briskness and sparkle to Australian picnics; and which has given Englishmen of the nineteenth century the new sensation which Xerxes ineffectually signed for—this beverage, I say, is one of the fruits of acclimatisation, and must be taken credit for accordingly. Fully to appreciate what this beneficial agency has accomplished for the mother country, we have only to picture one of her counties denuded of every natural feature which has been borrowed from abroad. Take the county of Kent for example, and obliterate from its surface those lovely hop gardens, with their "long-drawn aisles," overrun with a living tracery of green and gold; those leafy orchards, glowing with their ruddy fruitage; those rippling fields of yellowing wheat; those picturesque hedgerows of hazel and hawthorn; those stately gardens at Knowle, Cobham, and Penshurst; those chequered masses of colour which beautify every cottager's patch of homely flowers; and the face of the country would be not merely transformed, but deformed. It would be as unlike the Kent of to-day as a noble fresco would be unlike its former self after having received a thin coat of whitewash. I leave to other and to abler hands the task of showing what acclimatisation has done for England in so far as the animal kingdom is concerned; for the subject is a wide one, and is entitled to more skilful treatment than I am qualified to bestow upon it. I have confined my attention to one particular only; and I have selected this theme because it appears to me that we ought to derive encouragement here from the knowledge of what our forefathers accomplished elsewhere, under circumstances especially unfavourable to the work; for I need not remind you, that in the sixteenth century the means of communication between the different countries of the world were few in number, tedious in operation, and liable to all sorts of obstructions. The timid scruples, sordid suspicions, and jealous fears of one nation frequently prohibited or impeded the exportation of such seed or plants as were likely to prove beneficial to another; and all foreigners were looked upon as hateful rivals or natural enemies, whom it was lawful to defraud in time of peace, and to plunder and pauperise in time of war. If this stupid and barbarous policy is not wholly exploded, it is, at any rate, discountenanced by the more enlightened citizens of the more civilised nations of the world in our time; and hence the work of acclimatisation is comparatively easy, and a gratifying reciprocity of feeling and effort is exhibited by its friends in different countries. In applying ourselves to the work in this colony, we may be animated by such a retrospective glance as that which I have taken at what has been effected in this way, with a view to multiply the means of subsistence and the modes of enjoyment, as well as to augment the attractiveness of the natural scenery and the charms of social life in England. Coming into the inheritance of these things, both as a matter of custom and right, as such of us did who were born there, we are very apt to take it for granted that they existed from time immemorial, and to think no more of them than we do of the common blessings of light and air. But when we find upon inquiry and reflection, that the energy, the enterprise, and the forethought of acclimatisers in the sixteenth century mainly contributed to make England the picturesque garden which it is in the nineteenth, we may not unreasonably ask ourselves whether it is not in our power to confer similar obligations upon those who are to come after us in Australia. When we are invited to make some little sacrifices of time and money for posterity, we should reject as a malignant insult the sneering rejoinder of "What has posterity done for us?" The question which each generation has to propose to itself under such circumstances is this, What have preceding generations done for our own? And if any man will deliberately sit down and compute the sum of his obligations—the magnificence of the inheritance he enjoys—the legacy bequeathed to him in art, literature, and science by the illustrious dead:—if he will take into account the inventions which have virtually trebled the term of his existence—which have multiplied his delights and mitigated his sufferings—which have given the day labourer of to-day the command of comforts and enjoyments inaccessible to the most powerful monarchs two centuries ago—which have made life infinitely happier and more beautiful for all than it was formerly possible to be to the most favoured children of fortune—if he will honestly calculate this debt, "the long result of time," he will be startled by its magnitude, and will feel that nothing but the basest ingratitude or the most degrading selfishness could influence him in refusing to bestow upon posterity the slender pittance it may be in his power to offer, not in requital, but in acknowledgment of what he owes to those who have departed "to join the majority." In connection with this subject we may add that the great salmon experiment appears to be progressing in Australia as satisfactorily as the most sanguine of its promoters can desire. The parr, numbering about 300 in Victoria and 6,000 in Tasmania, by the last advices were about two months old, and perfectly healthy. An important question agitating the minds of the acclimatisers was as to the best means of disposing of the Victorian contingent. Some recommended the Gipps Land rivers, and others the Gellibrand, in the Otway district; while a third section, who had an eye to the advantage of market proximity, suggested the Yarra, which runs by Melbourne, as best depository for the young salmon. To assist in the solution of the difficulty, Mr. Ramsbottom, who brought out the ova from England, and who has the superintendence of the salmon breeding-ponds in Tasmania, had specially come over from Hobart Town, and gone up the Yarra between forty and fifty miles. So far as we can learn he has seen nothing to warrant the impression that it would not make a suitable salmon stream. Watts'

Creek or Badger's Creek, it appears, would form a desirable nursery. Both are in the neighbourhood of Mount Riddell, and both are fed by springs and snow. Mr. Ramsbottom was also to proceed to Gipps Land, in order to make an inspection of the rivers in that part of the colony. An interesting discussion as to the future home of the salmon took place at the *conversazione* of the Acclimatisation Society. Mr. Ramsbottom was present. He expressed his belief that in about twelve months hence the young fish would be ready to go down to the sea as smolts, and that in another year there would be salmon in the river selected for the experiment, though it would not be fit for market. In order to preserve the salmon from poaching, Mr. Ramsbottom recommended the imposition of severe penalties for such offences until a return can be obtained. When this return comes, he says, the colony of Victoria will have about 50,000 in place of the 300 now in its possession.

RIVER COD.—The first fresh Murray River cod ever imported and cooked in Tasmania was served up to a dinner party at Brisbane. The fish was dispatched from Echuca on the 18th of August, 1864, and arrived by rail in Melbourne, where it was immediately put on board the steamer *City of Launceston*, and was received in Launceston on the 20th, in excellent condition. The flesh of the Murray River cod is not flaky like that of the English cod, but is very close and firm, and rather coarser, and does not possess the same flavour. The Tasmanian Rock cod, though much smaller, more closely resembles the English fish.

VICTORIA RAILWAY.—The revenue of the Melbourne railway, for the four weeks ended July 27, amounted to £3,201 15s. 4d., as compared with £2,999 taken in the equivalent period of last year. Upon the Hobson's Bay and St. Kilda lines the receipts for the four weeks, ending July 27, give a total of £5,482 19s. 7d. against £4,347 18s. 7d. received in the corresponding period of last year.

SALE OF ALPACAS.—Ten of the alpacas recently offered for sale by the New South Wales Government have been secured for Victoria at £21 each—a sum ridiculously low, considering the enormous expense attending the importation of the animals from Peru.

Obituary.

JOHN LEECH, the prince of modern caricaturists, died on Saturday evening, the 29th of October, 1864, at seven o'clock, in the 47th year of his age, after an illness of some months. Born in 1817, and springing from a middle-class family, John Leech was placed at the Charterhouse, where he was contemporary with Thackeray, with whom in latter life he formed an intimate friendship. His friends intended to bring him up as a surgeon, and after leaving school he was placed with a general practitioner at Hoxton. The readers of Albert Smith's "Adventures of Mr. Ledbury" will recollect the extraordinary vagaries of Mr. Rawkins—a character faithfully reproduced from the original, the surgeon with whom Mr. John Leech lived, and who was a constant source of mirth to his pupil and his companions. About this time Mr. Leech determined to turn a talent for drawing, which he believed himself to possess, to some practical account, and he used to give a half-humorous half-pathetic description of his carrying half over London a large lithographic stone which he had engraved, and which he vainly solicited various publishers to purchase. About this time came the establishment of *Punch*, and very shortly after its start Mr. Leech joined the new speculation, which he at once greatly aided, and of which he eventually became the marrow and the strength. His sketches, always full of life and character, were at first very crude and rough; year by year he mellowed and improved; year by year his hand gained greater cunning, while his eye kept all its freshness; year by year he enlarged his scope and increased his knowledge of his art. Of these charming productions of his pencil there is no need to speak. It has been complained of him that he was too horsey, but it was no affectation in him to draw what he delighted in, and all his horsiness was gentlemanly and varied. He drew English women and children as no other man could, and he followed the fashion in female dress with an accuracy and a quickness that were positively surprising. No sooner was there a change in the shape of bonnets, in the mode of dressing the hair, than you found it quietly satirised in the next week's *Punch*. So keen was his observation that he frequently worked a change in the fashionable James in the street, in the articles sold by the pavement-bordering hucksters, in the slang cries and chaff of the street boys. He detested foreigners, and in his drawings dilated on all their eccentricities and imperfections with grim humour, and once remarked, "I only drew them as they are! You should see the disgusting caricature of English men and women now in every print-shop in Paris." His landscape was as wonderful as his figure-drawing; with a very few touches he brought before you what he wanted with marvellous reality—a rolling sea with flying scud and heavy clouds banking up to windward—cliffs and beach—a croquet lawn—an open hunting-country—a stubble-field—a Scotch moor—a salmon river—nothing came amiss to him. The nature of his employment, and probably a great sensitive of organisation, made him peculiarly susceptible to annoyance from noises; and to such an extent had his bodily and mental powers suffered from these that he was ordered by his medical attendants to travel abroad during last summer. He returned to England somewhat better in physical health, but even more sensitive to the torture of the street organ and similar sources of noise. He was not, however, thought by his friends to be such a terrible sufferer as he really was, and on Friday he was able to call upon his medical man and consult with him for some time. On Saturday so little apprehension was entertained of any serious result that a party of children were enjoying themselves at his house when he expired.

Publications Issued.

THE ESSENTIALS OF SPELLING.—A comprehensive classification of the difficulties of English spelling and rules for spelling, and exercises thereon, adapted to the Revised Code Examinations, the Civil Service Examinations, and to schools generally. Third edition, revised and enlarged, by E. Jones, B.A. (F. Pitman).

Notes.

ROMAN DRAINAGE.—M. P. Secchi has sent to M. Elie de Beaumont, for the Paris Academy of Sciences, an account of the discovery of a field near Alatri, beneath which exists a complete system of drainage by means of burnt clay pipes, averaging fifteen inches in diameter, more than three feet in length, and somewhat less than an inch in thickness. At present these pipes are full of sediment and clay, and lie seven or eight feet beneath the surface; but it is said to be evident that this depth has been increased by progressive deposits, and that formerly the drains were much nearer the surface. The pipes enter each other little more than an inch and a half, and there is a space of about a centimetre between the diameters, evidently to allow for infiltration. It is supposed that the field so carefully drained was the place where military exercises occurred, and which is mentioned in the inscription already referred to as having been formed by the same Betilienus, who was twice elected

Censor for his public services. At his death a statue was raised in his honour, and his son was released from military service.

EFFECT OF RAILWAYS ON INCUBATION.—A strong suspicion is afloat that the constant habit of riding in railway carriages must be injurious to the brain and the nervous system of man, and there is something like collateral evidence of this supposed fact in the effect of the vibration on the incubation of fowls in France. It is found that in the hen houses situated very near railways hatching is extremely difficult, and that vast numbers of eggs yield very few chickens, and this is attributed, with every show of reason, to the vibrations of the earth, which, of course, are the more intense and of longer duration in proportion to the length of the train and its speed, and the proximity of the line of rails.

ACCLIMATATION OF A CHINESE FISH IN FRANCE.—The Acclimatation Society of Paris has for a long time made endeavours to introduce into the waters of Algeria and the south of France the famous gourami, a native of China, but which is acclimatized in Mauritius and Bourbon, where it prospers and multiplies in a remarkable manner, and at length its efforts seems likely to be successful. M. E. Liénard, a proprietor of property in Mauritius, has transmitted to the society seven living specimens of the fish received by way of Marseilles. These have been left in charge of Barthélemy La Pommerage, the director of the Museum of Natural History of Marseilles, in order that they may become accustomed to the climate of the country.

PRODUCE OF THREE POTATOES.—The *Hants Advertiser* states that three large-sized potatoes, planted in Mr. Ransom's garden, at Hawthorn-cottage, on Southampton-common, were this week dug up, and found to have produced 362, weighing in the aggregate 71 lbs. A dozen weighed 16 lbs., and four selected from the dozen weighed 6½ lbs. The largest single potato weighed 2 lbs. 7 oz. These potatoes were planted about three feet apart, and kept well earthed up as they grew, each root forming a small mound about 18 inches high.

THE WORKING WOMEN'S COLLEGE.—This college will open on the 26th instant, at 29, Queen's-square, Bloomsbury. On that evening, at eight p.m., there will be a general meeting of students and teachers, at which the presence of intending students is particularly desired, and at which addresses will be given by the teachers explanatory of the purpose and aim of the college. Classes have already been formed in English grammar, French, arithmetic, geography, Latin, English history, geometry, drawing, social economy, English literature, and botany. There will also be preparatory classes every evening for writing, reading, and the first four rules of arithmetic.

NORTH LONDON WORKING CLASSES INDUSTRIAL EXHIBITION.—Nearly 200,000 persons have visited this exhibition since the opening on the 17th ult. It will remain open till Monday next, when the closing ceremony will be performed by the Chancellor of the Exchequer. The awards of the adjudicators will be published in a few days, and the prizes will be distributed by the Earl of Shaftesbury in January.

SOUTH LONDON WORKING CLASSES INDUSTRIAL EXHIBITION.—A public meeting, explanatory of the object, and in furtherance of the exhibition of works of skill and industry proposed to be held in South London, was held on Tuesday evening, the 1st of November, at the Rosemary Branch Assembly Rooms, Peckham, under the presidency of J. T. H. Cotsell, Esq., F.L.S., who was supported by Captain Dresser Rogers, G. M. Murphy, Esq., G. Livesey, Esq., W. H. Miller, Esq., S. S. Taylor, Esq., &c. Mr. G. M. Murphy explained that the success attendant upon the exhibition which was recently held in the Lambeth Baths had encouraged the promoters to make another effort in the same direction, and they had met to inaugurate an exhibition on a larger and more comprehensive scale, but nevertheless one which would be confined exclusively to the productions of the labouring classes. This Exhibition would differ materially from the last, and also from that now open in the north of London, inasmuch as it was intended to offer money prizes, varying in value from £1 to £10, as it was thought that many working men would be put to a great expense, and might incur an outlay which they could ill afford, in preparing articles for exhibition; and the prizes were intended to *recoup* them that outlay in some slight degree. However, if the exhibitor preferred it, he might have some other memento in lieu of money, as it was not intended to force money prizes upon those who would prefer something else. The guarantee fund was for the expenses incurred, and was totally distinct from the prizes. A resolution, "That this meeting, having heard the statement of the hon. secretary of the South London Working Classes Industrial Exhibition, hereby approve the project and accord it their most hearty support," was carried unanimously.

FLAX.—It is stated, on good authority, that the flax crop of Ulster, for 1863, was worth at least £20,000,000 to the country when manufactured.

DISCOVERY OF OLD COINS.—During excavations made at Saint Pons, in the department of the Hérault, in France, a mass of 300 to 400 coins was discovered; they are of silver, very thin, and but little oxidized. They are what are called Sols Melgoriens money, struck in the twelfth and thirteenth centuries, at Melgueil or Manguio, by the Bishops of Magnelone, and were current throughout Lower Languedoc. A piece of copper was found with the coins, and is conjectured to have formed a portion of the purse in which they were originally contained.

COTTON EXHIBITION AT NAPLES.—A curious announcement has appeared in the French journals which it will be best to give in the exact terms employed:—"M. Flourens announces that an exhibition is to be opened at Naples, concerning cotton. A scientific congress is to be held during the last fortnight, and the French savants are invited to attend."

GEOLOGICAL CONGRESS IN FRANCE.—The first meeting of this congress took place the other day at Marseilles, and has just commenced a series of visits to the various places of interest, in a geological point of view, in Province. More than forty members of the society were present, including several foreigners, but no English name appears in the list given. The first meeting was principally devoted to communications made by Messieurs Cogand and Matheron, who have given special attention to the geology of Province, and who were elected presidents. The congress will devote two days to a visit to Martignes and Berre.

Correspondence.

STUDY OF GEOMETRY.—SIR,—I take the liberty of saying a few words in your *Journal* as to the science of geometry. It is felt by many, and I think rightly so, that this is rendered unnecessarily abstruse. The range of education is now very great, embracing as it does nearly fifty different branches. It is true that but few, comparatively speaking, master the elements of all of them, but this is not material; even our Gamaliels admit that, as I believe, education must, ere long, be subject to a process of simplification. What is the difficulty in making geometry comprehensible to the million? It is not supposed by me that a general excellence will be attained in this, far from it. Some minds no doubt seem but little adapted to the understanding of the physical sciences. However this may be, it is really desirable to do something in this direction, even if it only be to lessen the wear and tear of our brains. An undue expenditure of this character weakens the mind, and unfits the student for the "struggles of life." This is, I think, as you will agree with me, worthy of consideration by the Council of your Society. Indeed, I might say that this question in

volves several results of serious importance. At present, however, I pass these by, though on another occasion I may advert to them. Why, sir, is Euclid still retained as the school book on this subject? In settling this question I wish to be understood as entertaining the most profound veneration for this philosopher. Beyond all question his theories and problems afford excellent practice, and are, as is generally felt, well calculated to discipline the mind for the consideration of abstract subjects. This is all very well for persons of maturity, but these are ill adapted to our youth, whatever our practice may be to the contrary. Why cannot the results be given simply as observations and rules? It seems to me that this would answer every ordinary purpose, and be a great relief to our collegians. My apology is due for venturing to make these suggestions, but I beg leave to say that I write under a sense of duty. Youths well instructed in the outlines of geometry would, I think, subsequently acquire with pleasure the deeper truths of this science. It has been remarked of Palissy, the French potter, that he maintained his health by the pleasure he took in his studies. We little conceive the labour we can undergo when we work with pleasure and delight. Perhaps you will favour me by the early insertion of this letter in your *Journal;* this will call the attention of your learned readers to this subject.—I am, &c., J. CULVERHOUSE.

MEETINGS FOR THE ENSUING WEEK.

MON. ...Royal Inst., 2. General Monthly Meeting.
Medical, 8. General Meeting. 1. Dr. Gibb, "On Throat Cough." 2. A. Balmanno Squire, M.B., "On Diseases of the Skin caused by the Acarus."

TUES. ...Syro-Egyptian, 7·30. Mr. Joseph Bonomi, M.R.S.L., "Notice of certain Fragments of Egyptian Sculpture under the Portico of the Museum of Bath."

WED. ...Geological Society, 8. 1. Mr. P. Martin Duncan, M.B., "On some Fossil Corals from Jamaica." 2. Mr. Ralph Tate, F.G.S., "On the Correlation of the Irish Cretaceous Beds." 3. His Excellency Sir C. Elliott, K.C.B., "On the Earthquake which occurred in St. Helena, on August 15th, 1864." Communicated by the Secretary of State for the Colonies, through Sir C. Lyell, Bart., F.R.S., F.G.S.

Patents.

From Commissioners of Patents Journal, October 28th.

GRANTS OF PROVISIONAL PROTECTION.

Bags, &c.—2507—G. Coles, J. A. Jaques, and J. A. Fanshawe.
Baking apparatus—2499—M. and T. Gillingham.
Bolts, nuts, and rivets, forging—2447—E. Davies.
Bookbinding—2491—E. L. Nicolas.
Button holes, machines for working—2557—C. T. Judkins and W. H. Gosling.
Chains (flat)—2492—J. Webster.
Chains (toothed) for working in chain wheels—2515—J. Slater.
Chimney cap—2453—T. Brown.
Chromium, salts of—2460—B. Margulies and J. K. Leather.
Chronometer watches—2575—W. E. Newton.
Coal, &c., obtaining fuel, &c., from—2487—J. Cassell.
Coffer dams—2593—J. Shaw.
Cornice poles—2517—J. V. Jones and G. J. Williams.
Crinolines—2377—C. J. W. Machon.
Deodorising substances—2559—A. Hill.
Distance indicator—2597—R. A. Brooman.
Dress fastenings—2514—J. G. Taylor.
Driving bands and chains—2474—E. Allen.
Electricity, transmitting currents of—2533—W. R. Sykes.
Envelope machines—2501—G. H. Reay.
Fermentation, apparatus used in—2535—J. Watts.
Fibrous substances, dressing and finishing—2483—R. M. Hands.
Fibrous substances, tube frames for spinning—2549—H. Mason.
Fire-arms, breech-loading—2469—A. Muir.
Fire-arms—2482—G. N. Bolton.
Fires, composition for lighting—2503—J. W. Nottingham.
Gunpowder, barrels or casks for—2599—W. Hall.
Hair-brushing apparatus—2457—C. L. Oliver.
Heating and illuminating by hydro-carbon vapour—2510—F. Wilkins.
Hydraulic rudder break—2567—A. Paul and E. Paul.
Hydrocarbons, manufacture of—2525—J. Watson.
India-rubber threads—2516—R. Story.
Ink, manufacture of—2506—W. E. Newton.
Iron, bronze colouring—2504—H. Tucker.
Jewellery, setting stones in—2577—J. Ludwig.
Knife blades—2589—F. Walters.
Leather, hardening—2477—H and F. J. Kemp.
Ladies' waist buckles—2543—J. H. Brierley.
Lenses—2539—J. H. Dallmeyer.
Life-boats—2473—C. Chapman.
Locomotion, facilitating—2498—B. H. Jones.
Looms—2455—E. T. Hughes.
Lubricating apparatus—2541—W. Clark.
Metallic buttons—2467—J. P. Turner.
Motive power—2494—E. H. Huch and F. Winehausen.
Motive power—2555—F. A. Calvert.
Needles—2365—R. S. Bartleet.
Nut and lobster crackers—2521—A. S. Paterson.
Ordnance c.—2476—R. S. Prowse, H. Duke, and T. Clayton.
Ores, purifying—2472—G. Haseltine.
Organ pipes—2493 H. T. Wedlake and F. J. Kitsell.
Photography on cloth, &c.—2465—P. A. le Comte de Fontainemoreau.
Projectiles—2480—W. E. Newton.
Propelling machinery—2464—P. A. le Comte de Fontainemoreau.
Prussiates of potash, manufacture of—2468—T. Parkins.
Railway carriages—2509—F. Watkins.
Railway signals—2461—W. Anderson.
Railway signals—2512—L. G. Loiseau.
Railway trains, communication between passengers and guards in—2518—M. J. Rice.
Railway wagons and carriages—2537—P. Meulemans.
Railway wheels—2601—J. Whitley.
Refrigerators—1501—J. Macarthy.
Sail cloths, &c., fabric suitable for—2561—J. Bruce.
Sewing machines—1634—W. Brookes.
Sewing machines—2547—J. Hayes.
Ships, constructing and arming—2478—A. Jackson.
Ships' sails, reefing, &c., —2490—J. Butchart and H. Stroud.
Ships' sails, reefing and furling—2489—T. Shorey and J. Bell.
Ships' sails, reefing and furling—2551—E. Baines.
Ships' sails, reefing and furling—2591—M. Gandy.
Signals—2456—F. Tolhausen.
Slide valves—2502—T. Adams and G. J. Parsons.
Spring mattress—2055—J. C. Desumeur.
Steam-cultivation—2481—H. S. Coleman and A. G. E. Morton.
Steam engines, slide valves for—2454—J. W. Gibson.
Stoppers for bottles, &c.—2573—N. Thompson.
Taps, cocks, or valves—2495—T. Lambert and H. C. Soper.
Telegraphic posts—2463—F. W. Shields.
Theodolites, &c.—2375—J. Lister.
Tobacco, &c., rolling and twisting—2479—R. E. Donovan and M. and F. O'Farrell.
Vegetable fibrous materials, preparing—2470—W. Clark.
Water, machinery for raising—2523—F. Noble.
Weaving, battens for—2529—J. T. Cook.
Wool, oiling—2471—G. Davies.
Yarns, preparing—2475—T. Kenyon, jun.

INVENTION WITH COMPLETE SPECIFICATIONS FILED.

Fire-arms, breech-loading—2590—W. Snell.

PATENTS SEALED.

1075. F. T. Aldridge and M. J. Jackson.
1076. R. H. Smithett and J. Davidson.
1078. R. H. Smithett.
1080. J. Little.
1082. J. McCall and B. G. Sloper.
1089. O. C. Burdict.
1090. J. K. Crawford.
1094. R. A. Brooman.
1095. R. A. Brooman.
1096. J. Mieussey.
1100. J. L. Norton, F. Gregory, and J. Salmon.
1103. W. I. Meacock.
1104. G. Gell and W. Cafferata.
1105. F. S. Barker.
1108. A. V. Newton.
1113. P. Ward.
1114. E. H. Newby.
1115. D. Nevin and W. Coppin.
1122. Y. Parfrey.
1124. J. Potter.
1126. W. T. Henley.
1131. C. J. Richardson.
1132. J. Gardner, R. Lee, and G. H. Wain.
1139. G. Haseltine.
1141. I., J., C., L., and M. Jefferson.
1146. G. Hodgson and A. H. Martin.
1154. F. Martin.
1162. J. R. Abbott.
1163. W. Powell.
1173. F. H. Wenham.
1220. C. Liddell.
1226. F. Blackwell.
1278. W. E. Newton.
1293. J. Adams.
1394. G. Coles, J. A. Jaques, and J. A. Fanshawe.
1584. D. Crowe.
1648. J. Ellis and J. Adams.
1656. S. Fox.
1680. F. J. Bugg.
1751. B. Smith.
1853. G. Lansdown.

From Commissioners of Patents Journal, November 1st.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

2668. W. Wharton.
2671. E. Green and E. Green, jun.
2675. T. Moore.
2698. W. and T. Ryder.
2707. F. Bennett.
2766. J. Archer.
2751. J. H. Johnson.
2728. A., J., and J. Topham.
2753. A. F. Yarrow and J. B. Hilditch.
2863. G. T. Bousfield.
2720. E. Leigh.
2712. J. S. Jackson.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

2721. J. Newall.
2777. G. H. and H. R. Cottam.
2782. M. F. Isoard.
2788. J. Mallisson, jun.
390. D., R., and G. Nurse.